

Exhibit 2

1 UNITED STATES DISTRICT COURT
2 FOR THE NORTHERN DISTRICT OF OHIO
3 EASTERN DIVISION

4 *****

5 IN RE: NATIONAL

6 PRESCRIPTION OPIATE MDL No. 2804
7 LITIGATION

8 Case No.

9 This document relates to: 17-MD-2804

10 The County of Summit,

11 Ohio, et al v. Purdue Hon. Dan A. Polster
12 Pharma L.P., et al

13 Case No. 1:18-OP-45090

14 The County of Cuyahoga v.

15 Purdue Pharma L.P., et al

16 Case No. 17-OP-45004

17 *****

18 HIGHLY CONFIDENTIAL - SUBJECT TO
19 FURTHER CONFIDENTIALITY REVIEW
20 VIDEOTAPED DEPOSITION OF DAVID CUTLER, Ph.D.

21 Friday, April 26th, 2019

22 9:00 a.m.

23 Held At:

24 Robins Kaplan LLP

800 Boylston Street

Boston, Massachusetts

REPORTED BY:

Maureen O'Connor Pollard, RMR, CLR, CSR

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1 takes as an input the share of opioid shipments
2 which are due to misconduct on the part of the
3 defendants. If the court or for any other
4 reason -- if the court wishes to know the impact
5 of any particular single defendant or subset of
6 defendants, the model could be used to do that
7 because it would take as input those harms which
8 are related to that specific defendant or set of
9 defendants.

10 BY MR. KNAPP:

11 Q. And what you're referring to when you
12 say the share of opioid shipments which are due
13 to misconduct on the part of defendants, are you
14 referring to Professor Rosenthal's conclusions?

15 A. In the body of the report, the share
16 of shipments that result from misconduct on the
17 part of the defendants comes from Professor
18 Rosenthal's conclusions.

19 Q. And so you would have to redo your
20 report to reduce the amount of shipments that
21 you're calculating the percentages off of, is
22 that right?

23 MR. SOBOL: Objection.

24 BY MR. KNAPP:

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1 Q. Strike that.

2 If any defendant is not in the first
3 trial, you would have to redo your model to
4 remove the percentages of shipments associated
5 with that defendant, correct?

6 MR. SOBOL: Objection.

7 A. I would like to make a distinction.
8 The model is the model that translates shipments
9 into harms. That model would not need to be
10 reestimated. The inputs to the model, which
11 is -- which is the percentage of shipments which
12 are due to misconduct, that input would change,
13 and so, therefore, the harms would change, but
14 the model that's used would not change.

15 BY MR. KNAPP:

16 Q. Professor Cutler, you made no attempt
17 to link any alleged harm to any particular
18 prescription, is that right?

19 MR. SOBOL: Objection.

20 A. I did not relate the harm to any
21 particular prescription.

22 BY MR. KNAPP:

23 Q. And you didn't relate the harm to any
24 particular shipment either, did you?

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1 MR. SOBOL: Objection.

2 You can answer.

3 A. The harm is related to the aggregate
4 of shipments to particular areas, so it's not on
5 a shipment-by-shipment basis, but it is related
6 to the shipments going to different areas.

7 BY MR. KNAPP:

8 Q. But you did not attempt to apportion
9 harm and link it to a particular shipment, is
10 that correct?

11 A. Can you just explain what you mean by
12 "a particular shipment"?

13 Q. X company sent Y MMEs to Z company.

14 MR. SOBOL: Object to the form.

15 You can answer.

16 A. No, it did not relate any particular
17 shipment to harms.

18 BY MR. KNAPP:

19 Q. And you made no attempt to link any
20 particular type of opioid to the harms you
21 analyzed in your report, right?

22 A. That's correct. We took all the
23 opioids together here.

24 Q. So you treat for purposes of your

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1 report all opioid medicines as if they're the
2 same, right?

3 MR. SOBOL: Objection.

4 A. They're not the same in terms --
5 they're treated as similar given the MMEs, given
6 the milligrams of morphine equivalent. That
7 differs across medications. So, for example,
8 one prescription of one medication, say 30
9 pills, and 30 pills prescription of a different
10 medication, they have different milligrams of
11 morphine equivalents and, therefore, they would
12 contribute differently to the shipments which
13 are then related to the harms.

14 BY MR. KNAPP:

15 Q. Other than making the conversion for
16 milligrams -- morphine milligram equivalence,
17 you treated all opioid medicines as if they were
18 the same, correct?

19 MR. SOBOL: Objection.

20 A. Other than for the MME conversion,
21 they were added together -- there's another
22 issue, which is two of the categories of opioid
23 medications are used as both treatments for pain
24 and as treatments for addiction, and so we had

<p style="text-align: right;">Page 62</p> <p>1 to decide those were buprenorphine and 2 Methadone, so in the end the shipments variable 3 that I decided to use does not include shipments 4 of buprenorphine or of Methadone because using 5 the data that we have, we cannot separate out 6 which of those shipments are for treatment of 7 pain and which of those shipments are for 8 treatment of opioid addiction.</p> <p>9 Q. So I'm focused on shipments that you 10 did include in your analysis. Other than making 11 the conversion for morphine milligram 12 equivalents, you treated all opioid medicines as 13 if they were the same, right?</p> <p>14 MR. SOBOL: Objection. Form.</p> <p>15 A. Yes. Once drugs had been converted to 16 milligrams of morphine equivalent, and once we 17 had decided on which drugs to include, then all 18 drugs contributed equally, and we looked at the 19 milligrams of morphine equivalency as a whole.</p> <p>20 BY MR. KNAPP:</p> <p>21 Q. So you assume in your model that all 22 opioids have the same likelihood of contributing 23 to the harms that you analyzed regardless of the 24 particular characteristics of the opioid, is</p>	<p style="text-align: right;">Page 64</p> <p>1 separately for different active ingredients.</p> <p>2 Q. And you understand that different 3 types of opioids have different potential risks 4 for abuse and addiction, right?</p> <p>5 A. I'm not a toxicologist, so I don't -- 6 I do not have an expert opinion as to whether 7 different types of opioids have different 8 potential for addiction.</p> <p>9 Q. But you assume for purposes of your 10 report, at least implicitly, that all different 11 types of opioid medicines that you looked at in 12 your report were equally likely to contribute to 13 harms, right?</p> <p>14 MR. SOBOL: Objection.</p> <p>15 A. No, that's not correct.</p> <p>16 MR. KNAPP:</p> <p>17 Q. How did you adjust for the -- other 18 than the morphine milligram equivalent 19 adjustment that you made, how did you account 20 for the different characteristics of particular 21 types of opioids?</p> <p>22 A. If you're asking about the direct 23 model, again what we're estimating here is the 24 average effect, so it is the average impact of</p>
<p style="text-align: right;">Page 63</p> <p>1 that right?</p> <p>2 MR. SOBOL: Objection.</p> <p>3 A. No, that's not the way I would phrase 4 it.</p> <p>5 BY MR. KNAPP:</p> <p>6 Q. Well, so, for example, you treated, 7 after making your MME adjustment, you treated 8 oxycodone and hydrocodone as if they were the 9 same, right?</p> <p>10 MR. SOBOL: Objection.</p> <p>11 A. What we are estimating in these models 12 is the average impact, so the impact of the 13 average shipments on -- at least in the direct 14 model we're estimating the impact of the average 15 shipments on harms. That doesn't have to mean 16 that each individual drug has the same impact; 17 it rather means that what we're getting is on 18 net the relationship between them, that is the 19 average relationship.</p> <p>20 BY MR. KNAPP:</p> <p>21 Q. Did you make any adjustments in your 22 model for the active ingredient included in any 23 of the opioid shipments that you looked at?</p> <p>24 A. I did not estimate the model</p>	<p style="text-align: right;">Page 65</p> <p>1 opioid shipments in MMEs on harms. That does 2 not require that each medication have the same 3 impact. Rather, it's saying what is the typical 4 relationship between shipments of MMEs and harms 5 across areas.</p> <p>6 To the extent that different 7 medications have different harms and that they 8 were shipped differently in different areas, 9 that would then be one of the factors that is in 10 the residual. That would be a difference across 11 areas. But the model does not require that the 12 harms be the same for each particular type of 13 opioid.</p> <p>14 Q. So looking back at Paragraph 31, it 15 says "The analysis presented here does not 16 attempt to uniquely apportion." What does 17 "uniquely apportion" mean in that sentence?</p> <p>18 A. When the sentence says the article -- 19 "The analysis presented here does not attempt to 20 uniquely apportion harm resulting from actions 21 by any individual type of defendant," uniquely 22 in terms of estimating each individual 23 defendant's contribution to the total harm.</p> <p>24 Q. So, for example, you don't have any</p>

<p style="text-align: right;">Page 66</p> <p>1 opinion regarding any harms that were 2 specifically caused by Allergan Finance, right? 3 A. In this model we -- I do not have any 4 particular -- I do not have any harms that are 5 attributed to any particular defendant. 6 Q. And so going back to the point that we 7 were just talking about, if a particular 8 defendant manufactured or distributed a type of 9 opioid that had less risk for abuse than other 10 types of opioids, your model doesn't make any 11 adjustments in terms of allocating percentages 12 of harm to that defendant based upon the types 13 of opioids that they sold? 14 MR. SOBOL: Objection. 15 A. In this model there is no allocation 16 to any single defendant, and so, therefore -- 17 let me just say there is no -- there is no 18 allocation to any single defendant. 19 BY MR. KNAPP: 20 Q. Well, isn't it possible, Professor 21 Cutler, that you could rule out certain 22 defendants as having contributed to some of the 23 harms that you looked at? 24 MR. SOBOL: Objection.</p>	<p style="text-align: right;">Page 68</p> <p>1 misconduct. In the case of the model here, she 2 provides the share of the shipments in each year 3 that are a result of misconduct on the part of 4 defendants as a whole. If one had data on the 5 share of shipments that result from a specific 6 defendant in a particular year, one could feed 7 that into the model here and calculate -- the 8 model that I developed and calculate the harms 9 from that. 10 BY MR. KNAPP: 11 Q. But you haven't done that here, right? 12 A. I have not done anything with respect 13 to any specific defendant. 14 Q. And so to the extent that a defendant 15 wasn't marketing, manufacturing, or distributing 16 from 2006 to 2009, you still attribute harm to 17 that defendant, correct? 18 MR. SOBOL: Objection. 19 A. That's not correct. 20 BY MR. KNAPP: 21 Q. Why is that not correct? 22 A. It's not correct because it is 23 attributing the harm to the defendants as a 24 whole. It is not attributing it to any specific</p>
<p style="text-align: right;">Page 67</p> <p>1 A. The model that I have here is not 2 designed to do that. One would need to develop 3 a different model to do that for each specific 4 defendant. I haven't developed that model. 5 BY MR. KNAPP: 6 Q. Well, let's just say that a 7 manufacturer didn't start manufacturing 8 prescription opioids until 2010, okay? That's 9 the hypothetical here. Your model would 10 attribute harms from 2006 to 2009 to that 11 defendant, correct? 12 MR. SOBOL: Objection. 13 BY MR. KNAPP: 14 Q. As part of the group of defendants, 15 they are attributed harm according to your 16 model, is that right? 17 MR. SOBOL: Objection. 18 A. What the model gives is the harm that 19 results from all the defendants together. If 20 the court wished to know about the impact of any 21 individual defendant, the way to do that would 22 be through the inputs that Professor Rosenthal 23 provides where she provides the share of 24 shipments in each year that are a result of</p>	<p style="text-align: right;">Page 69</p> <p>1 defendant. And there is nothing in this report 2 that says in order to attribute it to a specific 3 defendant, follow the following procedure. 4 Q. All right. In Paragraph 31 you also 5 refer to indivisible harms. What are 6 indivisible harms? 7 A. Can you just refer me to the very 8 specific wording? 9 Q. It's in Paragraph 31, it's in the 10 third line. 11 A. Thank you very much. 12 An indivisible harm is a harm where -- 13 at least as I was using the term, it's a harm 14 where multiple parties may be responsible for 15 the same harm. 16 So, for example, in a situation where 17 a manufacturer inappropriately promotes a 18 medication and where a distributor 19 inappropriately does not flag a suspicious 20 shipment, then that is an indivisible harm, at 21 least as I'm using the word, because there are 22 multiple parties, that each were at fault. 23 Q. And how did you determine that the 24 harms that you analyzed in your report were</p>

<p style="text-align: right;">Page 70</p> <p>1 indivisible?</p> <p>2 MR. SOBOL: Objection.</p> <p>3 You may answer.</p> <p>4 A. I did not make a -- I did not make a</p> <p>5 determination in this report as to which</p> <p>6 specific harms resulted from, for example,</p> <p>7 manufacturers and which specific harms resulted</p> <p>8 from distributors, so I did not do a division of</p> <p>9 the harms that way.</p> <p>10 BY MR. KNAPP:</p> <p>11 Q. My question was, how did you determine</p> <p>12 that these particular harms were indivisible?</p> <p>13 MR. SOBOL: Objection.</p> <p>14 A. This is a statement not that I</p> <p>15 determined that, but rather it was a reason why</p> <p>16 I was bolstering the argument in the first</p> <p>17 sentence, which is in part why I did not try to</p> <p>18 uniquely apportion harm. And I was giving an</p> <p>19 example of why one might not want to try to</p> <p>20 uniquely apportion harm as a specific example of</p> <p>21 which might be harms that are indivisible.</p> <p>22 BY MR. KNAPP:</p> <p>23 Q. So do you -- strike that.</p> <p>24 Do you have an opinion whether these</p>	<p style="text-align: right;">Page 72</p> <p>1 each party because the harm would not have</p> <p>2 occurred unless -- it had to be the case that</p> <p>3 both parties failed their responsibilities in</p> <p>4 order for the harm to occur.</p> <p>5 Q. And so here did you conclude that it's</p> <p>6 impossible to uniquely attribute harm to each</p> <p>7 contributing party?</p> <p>8 MR. SOBOL: Objection.</p> <p>9 A. No, I did not conclude that it was</p> <p>10 impossible to do so. I merely noted why I was</p> <p>11 not doing so here.</p> <p>12 BY MR. KNAPP:</p> <p>13 Q. So -- strike that.</p> <p>14 Do you agree that there are parties</p> <p>15 that are not defendants here that contributed to</p> <p>16 the harms that you analyzed in your report?</p> <p>17 MR. SOBOL: Objection.</p> <p>18 A. That sentence is too vague for me to</p> <p>19 give a yes or no answer to.</p> <p>20 BY MR. KNAPP:</p> <p>21 Q. Do you believe that there are</p> <p>22 individuals or entities that contributed to the</p> <p>23 harms that you analyzed that are not defendants</p> <p>24 in this lawsuit?</p>
<p style="text-align: right;">Page 71</p> <p>1 harms are indivisible, or are they divisible?</p> <p>2 A. I do not have an opinion about that.</p> <p>3 Q. All right. If we go to the next</p> <p>4 clause of that sentence, it says "It is unlikely</p> <p>5 that a unique attribution of harm to each</p> <p>6 contributing" possible -- "each contributing" --</p> <p>7 excuse me -- "party is possible."</p> <p>8 Do you see that?</p> <p>9 A. Yes, I do see that.</p> <p>10 Q. Why is it unlikely?</p> <p>11 A. I'm going to tell you what I meant,</p> <p>12 which was economics language, and that may not</p> <p>13 be -- I'm not sure I'm going to get the legal</p> <p>14 words correctly, so just to give you that.</p> <p>15 As an economic matter, if there is a</p> <p>16 harm which both parties are responsible for the</p> <p>17 full extent of the harm, for example, one party,</p> <p>18 the manufacturer, is engaged in misconduct in</p> <p>19 promoting the medication inappropriately and</p> <p>20 another party, the distributor, engaged in</p> <p>21 misconduct by not noting the suspicious</p> <p>22 shipments, then in essence both are responsible</p> <p>23 for the harm, and as an economic matter one</p> <p>24 could not assign a percentage of the blame to</p>	<p style="text-align: right;">Page 73</p> <p>1 MR. SOBOL: Objection.</p> <p>2 A. I don't make a determination here as</p> <p>3 to who gets what portion of the blame, so that's</p> <p>4 not -- that's not an area that I have an opinion</p> <p>5 upon.</p> <p>6 BY MR. KNAPP:</p> <p>7 Q. Your model cannot rule out that there</p> <p>8 are individuals or entities that contributed to</p> <p>9 the harms that you analyzed that are not</p> <p>10 defendants in this case?</p> <p>11 MR. SOBOL: Objection.</p> <p>12 A. I haven't made any -- the model does</p> <p>13 not rely upon any specific delineation as to who</p> <p>14 it was that caused the harm.</p> <p>15 BY MR. KNAPP:</p> <p>16 Q. Now, Professor Cutler, that wasn't my</p> <p>17 question.</p> <p>18 My question was, your model does not</p> <p>19 rule out that there are individuals or entities</p> <p>20 that contributed to the harms that you analyzed</p> <p>21 who are not parties to this lawsuit?</p> <p>22 MR. SOBOL: Objection. Asked and</p> <p>23 answered twice.</p> <p>24 A. Again, I haven't made any</p>

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1 identification of shipments that she attributes
2 to the defendants tell you whether someone who
3 committed suicide had other mental illness
4 factors that would cause them to commit suicide
5 as opposed to, you know, the opioids being the
6 cause of the suicide?

7 A. Dr. Rosenthal's analysis doesn't
8 directly assess that. That comes out of the
9 models that I do.

10 So let's say it were the case, for
11 example, that the people who are taking opioids
12 and dying of opioids would have in the absence
13 of opioids taken cocaine and died of cocaine.
14 Then when I relate in my -- in the models that I
15 estimate, when I relate death rates from drug
16 overdoses to opioid shipments, I would find no
17 impact, or when I relate -- when I relate crime
18 to shipments of opioids I'd find no impact,
19 because in the hypothetical that you gave it's
20 all just a substitution from one to the other,
21 and so, therefore, the shipments of opioids to
22 an area would not be related to any measurable
23 harm.

24 Q. That answer that you just gave, that

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1 relies on the assumption that you have included
2 all the variables in your report that would
3 explain why somebody might commit suicide,
4 right?

5 MR. SOBOL: Objection.

6 A. No, actually not. If all there was
7 was a substitution from suicide to accidental
8 poisoning, then a combined measure of mortality
9 that included them both would not be related to
10 drug shipments at all, provided one were looking
11 at all the causes of death.

12 So it's -- so a substitution from A to
13 B wouldn't affect the estimates if you're
14 looking at the total of A and B together.

15 BY MR. KNAPP:

16 Q. If we look back at Page 3 of Cutler
17 Exhibit 8, do you see that there's a comment
18 there that says "In addition to these general
19 social stresses, there had been a concurrent
20 drug epidemic that may have been intimately
21 related to the suicide epidemic." Then it goes
22 on to say "A nationwide decrease in the price of
23 heroin resulted in an increase in heroin use by
24 even very young adolescents in South Boston in

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1 1995 and 1996."

2 Do you see that?

3 A. Yes, I do see that.

4 Q. You opined or you wrote that there was
5 a heroin -- strike that.

6 You wrote that there was a drug
7 epidemic in 1995 and 1996 in South Boston that
8 included the use of heroin, right?

9 MR. SOBOL: Objection.

10 A. It was terrible. Yes, there was.

11 BY MR. KNAPP:

12 Q. And you attributed one of the --
13 strike that.

14 You identified one of the reasons for
15 the epidemic was a decrease in the price of
16 heroin.

17 Do you see that?

18 A. Yes, that's correct.

19 Q. And you understand that there was
20 generally a decrease in the price of heroin in
21 the United States in the 2010s, right?

22 A. Yes, that's correct, there was a
23 decrease in the price of heroin.

24 Q. And you haven't controlled for the

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1 decrease in the price of heroin in connection
2 with your regression models, correct?

3 A. Actually, I don't think that it would
4 be appropriate to control for the price of
5 heroin in those models.

6 Q. So the answer is you haven't done it?

7 MR. SOBOL: Objection. Asked and
8 answered.

9 A. I haven't done it because it wouldn't
10 be appropriate to do so.

11 BY MR. KNAPP:

12 Q. And you haven't attributed any of the
13 harms that you identify as resulting from the
14 opioid epidemic to the decrease in prices
15 associated with heroin, right?

16 A. The decrease in prices associated with
17 heroin to a great extent are because the markets
18 for heroin got to be what economists called
19 thick markets, which is more people on the --
20 more people on the supply side, more people on
21 the demand side.

22 The reason they got to be so thick --
23 the reasons the markets got to be so thick is
24 because there were so many people that had been

<p style="text-align: right;">Page 322</p> <p>1 addicted to opioids, and then when the opioid 2 supply was reduced they went to look for other 3 alternatives, and heroin was a cheaper other 4 alternative. So that led more people into the 5 market. As a result of more people being in the 6 market, there were more sellers, there were more 7 buyers, and in thick markets like that prices 8 tend to fall.</p> <p>9 I think that the reduction in heroin 10 prices and the increase in heroin use are a 11 result of the factors associated with the 12 opioid -- legal opioid epidemic, and they are 13 not some exogenous change that just happened to 14 occur.</p> <p>15 Q. What analysis did you do to support 16 the statement you just made that the fact that 17 there were, quote, so many people addicted to 18 opioids created the thicker markets?</p> <p>19 A. If you look in the report, there are 20 several different pieces of evidence. One piece 21 of evidence comes from the test for the 22 structural breaks.</p> <p>23 MR. SOBOL: Pages?</p> <p>24 A. I'm sorry. Pages 33 and 34, Figure</p>	<p style="text-align: right;">Page 324</p> <p>1 increase in heroin mortality relative to other 2 areas that had lower shipments again 3 associated -- consistent with the creation of 4 thicker markets in areas where legal opioids 5 were more prevalent. So that's the second piece 6 of evidence.</p> <p>7 The third piece of evidence comes from 8 the literature of other economists that have 9 looked at the transition in opioid-related 10 deaths from legal opioids to illegal opioids. 11 Think about in particular two specific studies 12 which I'll just cite because we note them in the 13 report, the studies of Alpert, et al, and the 14 study of Evans, et al, both of which examined 15 the transition from legal opioids to illegal 16 opioids associated with supply side changes, and 17 both show very large substitution consistent 18 with people moving in and creating a thick 19 market.</p> <p>20 And then finally I cite numerous 21 studies of sort of anthropological studies or 22 epidemiological studies of people who were 23 abusing illegal opioids, particularly heroin, 24 after 2010, and many of the people in those</p>
<p style="text-align: right;">Page 323</p> <p>1 3.2 and 3.3. What those figures show is that 2 the transition from deaths which were largely 3 due to legal opioids to deaths which were due -- 4 largely due to illegal opioids, that happened 5 very suddenly in 2010. That's, of course, 6 exactly around the time formulation of -- the 7 time of the reformulation of OxyContin to 8 abuse-deterrent formulation, and reflects the 9 fact that people were moving into markets for 10 illegal opioids as their preferred legal opioids 11 became more difficult to obtain. So that's one 12 piece of evidence that suggests that -- that is 13 consistent with the thickening of the markets.</p> <p>14 A second piece of evidence comes from 15 Figure 3.4 on Page 35 of the report. What that 16 figure shows you, the red line is the heroin 17 mortality rate for the counties in the sample 18 that I analyze that had high shipments. Those 19 counties always had a little bit higher heroin 20 mortality rate prior to 2010, but in those areas 21 where there were more people taking prescription 22 -- excuse me -- more people who were -- more -- 23 where there were more shipments of prescription 24 opioids, those areas had a particularly large</p>	<p style="text-align: right;">Page 325</p> <p>1 studies started on prescription medications and 2 transitioned to heroin over time and helped to 3 create a thicker market there. So I believe 4 there -- there's quite a lot of evidence in 5 support of that.</p> <p>6 BY MR. KNAPP:</p> <p>7 Q. Okay. Let's -- there was a lot there, 8 so we're going to unpack that, okay?</p> <p>9 A. Very good.</p> <p>10 Q. Let's start at Paragraph 48, because I 11 think that's where this analysis starts. And 12 what you're talking about in Paragraph 48 is why 13 you ran two different regression frameworks to 14 estimate the impact of shipments on opioid 15 mortality, right?</p> <p>16 A. Yes, that is correct.</p> <p>17 Q. And what you say is it's due in part 18 to data limitations. Okay? Is that right?</p> <p>19 A. Yes. I can't remember if that said so 20 specifically in this paragraph or elsewhere, but 21 yes, I do say that it's due to data limitation.</p> <p>22 Q. And so what are the data limitations 23 that you're referring to there?</p> <p>24 A. Let me just look at this specific</p>

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1 another.

2 There's also, of course, the papers by
3 Evans, et al and Alpert, et al, that they looked
4 very specifically around August of 2010 with the
5 reformulation of OxyContin, so those papers also
6 influenced my thoughts as to the appropriate
7 break point, and in their case it was August of
8 2010. And so more of the year 2010 was in the
9 pre-reformulation time period than the post
10 reformulation time period.

11 Q. Did you do any analysis of whether the
12 population of people who overdosed on illicit
13 opioids after 2010 first became addicted to
14 prescription opioids prior to 2010, any data
15 analysis?

16 A. I did not do data analysis on when the
17 people who overdosed after 2010 started using
18 opioids.

19 Q. And so you don't know if a particular
20 overdose after 2010 was an overdose of someone
21 who had become addicted prior to 2010?

22 A. That's correct, I did not do any
23 analysis at any individual level to say whether
24 a particular -- how long a particular individual

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1 had been addicted before he or she died.

2 Q. And you didn't do any demographic
3 analysis at a more macro level to identify
4 whether the population of addicts prior to 2010
5 matched up with the population of overdose
6 victims after 2010?

7 A. There are several pieces of data that
8 point to that. First is Figure 3.4 which is on
9 Page 35 of the report. Figure 3.4 shows that
10 the share -- shows that the increase in the
11 overdose rate after 2010 was significantly
12 greater in areas where there were greater
13 shipments of opioids prior to 2010.

14 And then in addition the paper by -- I
15 believe it's the paper by Alpert, et al shows
16 that the shipments of opioids to areas in the
17 2000s is related to the share of people who have
18 substance use -- who report substance use
19 disorder using the NISD data, and so, therefore,
20 from that it's -- those two correlations imply
21 that areas where more people are addicted to
22 opioids prior to 2010 are areas with greater
23 increases in mortality after 2010.

24 Q. So I understand you've got the

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1 correlation analysis here, but my question is,
2 did you look at any demographic statistics or
3 characteristics of individuals who overdosed
4 after 2010 and compare them to the
5 characteristics of people who were prescribed
6 and became addicted to prescription opioids
7 prior to 2010?

8 MR. SOBOL: Objection.

9 A. I did not do an analysis that looked
10 at the demographics of the addicted population
11 prior to 2010 and compare that with the
12 demographics of death after 2010.

13 BY MR. KNAPP:

14 Q. You would agree that some percentage
15 of people that overdosed on illicit opioids
16 after 2010 started on opioids after 2010?

17 A. I don't have any data, but I would be
18 surprised if that were not the case.

19 Q. And do you know what percentage of
20 overdoses that represents?

21 MR. SOBOL: Objection.

22 A. No, I have not seen any data on people
23 with overdose deaths when they started using
24 overdose -- excuse me -- when they started using

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1 opioids with the deaths at different points in
2 time. I haven't seen anything on that.

3 BY MR. KNAPP:

4 Q. And you would agree that some
5 percentage of people that overdosed on illicit
6 opioids after 2010 first became addicted to an
7 illicit opioid, not a prescription opioid?

8 MR. SOBOL: Objection.

9 A. I don't know for a fact whether that's
10 true or not. I don't -- I -- if you ask me as a
11 statistical matter would there likely be people
12 like that, I would absolutely say yes.

13 Just to reference our earlier
14 discussion, the heroin markets and fentanyl
15 markets became what economists call thick
16 markets in part because of the opioid epidemic,
17 so even individuals who never took a licit
18 opioid but who started on illicit opioids may
19 very well have been affected by the actions of
20 the defendants that created such a large market
21 for illicit opioids.

22 BY MR. KNAPP:

23 Q. And I just want to clarify here. You
24 said -- at least the transcript says so, even

<p style="text-align: right;">Page 358</p> <p>1 individuals who never took a licit opioid but 2 who started on illicit opioids may very well 3 have been affected by the actions of the 4 defendant. It's individuals who never took a 5 licit opioid, you're saying that they're still 6 impacted by the actions of these defendants? 7 MR. SOBOL: Objection. 8 A. That is correct, that's what I'm 9 saying. 10 BY MR. KNAPP: 11 Q. And did you do any analysis of whether 12 anyone reflected in the mortality data that you 13 analyzed had actually received a prescription 14 from a doctor for a prescription opioid? 15 A. No, I haven't done any analysis of 16 whether people in the death records had any 17 prescriptions, and I don't know of any 18 literature that has done so. 19 Q. And so you can't say that any of the 20 mortality that you attribute to -- strike that. 21 You can't say whether any of the 22 increase in mortality that you attribute to 23 defendants resulted from individuals who 24 actually got a prescription for one of the</p>	<p style="text-align: right;">Page 360</p> <p>1 expensive and more difficult to obtain legal 2 substances. 3 And so -- and that movement of people, 4 that movement of people into illegal markets 5 makes those markets be thicker in an economic 6 sense, more readily available, and therefore 7 much lower cost -- by cost I mean monetary, 8 time, potential consequences and so on -- much 9 lower cost for people who start off even in the 10 illegal market. 11 BY MR. KNAPP: 12 Q. Did you do any data analysis of the 13 thickness of markets for illegal opioids in 14 Summit or Cuyahoga County? 15 A. There are reports that were -- so did 16 I -- there's not a single measure of how thick 17 the market is that one can produce an estimate 18 for. There are a number of reports that were 19 done that I believe are in the estimates from 20 the -- from the -- I'm trying to remember 21 whether they're from the police or from the 22 sheriff's, I can't remember who, that document 23 over time what people are saying about ability 24 to get opioids, and those do show increased</p>
<p style="text-align: right;">Page 359</p> <p>1 opioids that was manufactured or distributed by 2 any defendant? 3 MR. SOBOL: Objection. 4 A. Two comments. One is I can't say that 5 for sure. But second is I also don't think 6 that's entirely relevant to the point that's 7 being made here. 8 The point that's being made is that 9 even if the individual did not start on licit 10 opioids, that individual's access to illicit 11 opioids is due at least in some part to the 12 misconduct of the defendants in terms of having 13 such a high level of shipments of opioids. 14 BY MR. KNAPP: 15 Q. And so defendants are indirectly 16 responsible for that, in your view, because 17 they're responsible for creating the environment 18 for criminals? 19 MR. SOBOL: Objection. 20 A. They're responsible for creating an 21 environment in which people are addicted. Those 22 people who are addicted, some of them naturally 23 turn to illegal substances because it's cheaper. 24 Some turn to illegal substances as it gets more</p>	<p style="text-align: right;">Page 361</p> <p>1 ability to get illegal opioids. 2 Q. Professor Cutler, did you personally 3 do any analysis of the thickness of the market 4 for illicit opioids in Summit or Cuyahoga County 5 at any time period that you analyzed? 6 MR. SOBOL: Objection. Asked and 7 answered. 8 A. Unfortunately -- going back to our 9 earlier discussion, unfortunately we don't have 10 data on the total use of illegal opioids 11 anywhere, whether it's in Summit or Cuyahoga or 12 any other county. So if one wanted to look at 13 use of those substances, one simply does not 14 have the data to do so, so I could not do an 15 economic analysis of the use of illegal 16 substances in those markets. What I know are 17 the death rates that come from that. 18 There are also data, of course, from 19 NSDUH on the share of people who have substance 20 use disorder, and they also show an increase 21 across the country and in Ohio in substance use 22 disorder associated with illegal opioids. 23 BY MR. KNAPP: 24 Q. And to be clear, none of the papers</p>

1 UNITED STATES DISTRICT COURT
2 FOR THE NORTHERN DISTRICT OF OHIO
3 EASTERN DIVISION

4 *****

5 IN RE: NATIONAL MDL No. 2804
6 PRESCRIPTION OPIATE
7 LITIGATION Case No.
8 17-MD-2804

9 This document relates to:

10 The County of Summit, Hon. Dan A. Polster
11 Ohio, et al v. Purdue
12 Pharma L.P., et al
13 Case No. 1:18-OP-45090

14 The County of Cuyahoga v.
15 Purdue Pharma L.P., et al
16 Case No. 17-OP-45004

17 *****

18 HIGHLY CONFIDENTIAL - SUBJECT TO
19 FURTHER CONFIDENTIALITY REVIEW
20 VIDEOTAPED DEPOSITION OF DAVID CUTLER, Ph.D.

21 Saturday, April 27th, 2019
22 8:06 a.m.

23 Held At:
24 Robins Kaplan LLP
800 Boylston Street
Boston, Massachusetts

25 REPORTED BY:
26 Maureen O'Connor Pollard, RMR, CLR, CSR

<p style="text-align: right;">Page 409</p> <p>1 MR. KO: Object to the form.</p> <p>2 A. That is correct. It depends on, in</p> <p>3 essence, what does the supply look like. So</p> <p>4 what -- in economic terms, what the -- in this</p> <p>5 case the reformulation and the other actions</p> <p>6 that reduced the ability and increased the cost</p> <p>7 of obtaining prescription opioids, what that did</p> <p>8 was it reduced demand for prescription opioids</p> <p>9 because when it's more difficult to obtain,</p> <p>10 people obtain less of it, and it increased the</p> <p>11 demand for illegal opioids, first heroin and</p> <p>12 then later fentanyl.</p> <p>13 The exact extent to which that</p> <p>14 increase in demand translates into increased</p> <p>15 quantity depends upon a number of factors; for</p> <p>16 example, the extent of the illegal market in the</p> <p>17 area, the extent to which the product can be</p> <p>18 gotten into that area, the thickness of the</p> <p>19 market and, therefore, the cost, the</p> <p>20 transactions costs and the shipments costs</p> <p>21 of obtaining the product, the various</p> <p>22 distribution networks and so on. So it depends</p> <p>23 on all sorts of characteristics. That supply</p> <p>24 curve of illegal opioids has many, many things</p>	<p style="text-align: right;">Page 411</p> <p>1 sophistication of drug networks in Cuyahoga and</p> <p>2 Summit was a result of opioid shipments prior to</p> <p>3 2010?</p> <p>4 MR. KO: Object to the form.</p> <p>5 A. So I understand the words, so I'll try</p> <p>6 and answer, but I'm not sure I'm going to</p> <p>7 directly answer your question, so please let me</p> <p>8 know if I'm not directly answering your</p> <p>9 question.</p> <p>10 The presence and sophistication of</p> <p>11 drug networks depends on -- in part on how many</p> <p>12 people are in those markets, so the more people</p> <p>13 that are in the market the more sophisticated</p> <p>14 the network becomes. Just like in any market,</p> <p>15 the more buyers there are, the more quantity</p> <p>16 there is, the more fluid becomes the market and</p> <p>17 the ability to get the product that people want</p> <p>18 to them when they want.</p> <p>19 So that's just a statement that in any</p> <p>20 market where -- the opioid shipments prior to</p> <p>21 2010 sort of created the set of people who would</p> <p>22 then transition into the illegal opioid market.</p> <p>23 And the more people that transitioned, the more</p> <p>24 is the demand for that, and, therefore, the</p>
<p style="text-align: right;">Page 410</p> <p>1 that go into it.</p> <p>2 BY MR. KNAPP:</p> <p>3 Q. Let's look at Paragraph 71 of your</p> <p>4 report. And on the second page on Page 41,</p> <p>5 second-to-last sentence, it says, "However, the</p> <p>6 presence and sophistication of drug networks is</p> <p>7 partially a result of opioid shipments prior to</p> <p>8 2010 as they create 'thicker' markets for</p> <p>9 illegal products."</p> <p>10 Do you see that?</p> <p>11 A. Yes, I do see that.</p> <p>12 Q. When did the -- well, strike that.</p> <p>13 When you state that pre-2010 shipments</p> <p>14 are partially a result -- strike that.</p> <p>15 When you state that the presence and</p> <p>16 sophistication of drug networks is partially a</p> <p>17 result of opioid shipments, what part of the</p> <p>18 presence and sophistication of the market in</p> <p>19 2010 was a result of pre-2010 legal prescription</p> <p>20 opioid shipments?</p> <p>21 A. I'm sorry. Can you just repeat the</p> <p>22 question?</p> <p>23 Q. What part -- strike that.</p> <p>24 What part of the presence and</p>	<p style="text-align: right;">Page 412</p> <p>1 greater the development of that market would</p> <p>2 be.</p> <p>3 BY MR. KNAPP:</p> <p>4 Q. You cannot quantify the contribution</p> <p>5 that pre-2010 shipments made to the presence or</p> <p>6 sophistication of drug networks in Cuyahoga or</p> <p>7 Summit after 2010?</p> <p>8 A. Unfortunately we don't have data on</p> <p>9 presence or the sophistication of drug networks</p> <p>10 anywhere. Because it's an illegal good, we just</p> <p>11 don't have that. So there's really no economic</p> <p>12 way to try and do a quantification of that.</p> <p>13 Q. How did you account for, in your</p> <p>14 analysis, that the presence and sophistication</p> <p>15 of illegal drug networks in Cuyahoga and Summit</p> <p>16 County after 2010 was the result of factors</p> <p>17 other than shipments of legal opioids?</p> <p>18 A. If the primary difference across areas</p> <p>19 were a result of other factors unrelated to</p> <p>20 anything having to do with consumption of</p> <p>21 opioids prior to 2010, then in Figure 3.4, when</p> <p>22 one looks at the relationship between pre-2010</p> <p>23 deaths from -- or excuse me, shipments of</p> <p>24 prescription opioids and post-2010 increases in</p>

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1 heroin, there would have been no difference
2 across those areas. So if it was all due to
3 something else, one wouldn't see any
4 relationship between the pre-2010 shipments and
5 the post-2010 increases in heroin deaths.

6 Q. Well, I'm not asking if it was all due
7 to something else. How did you account for --
8 if part of it was due to something else, how did
9 you account for that in your analysis?

10 MR. KO: Objection. Object to the
11 form. Objection, asked and answered.

12 A. So two points which I've said before.
13 One is I don't have data on the extent of the
14 illegal market so I don't know the number of
15 participants, I don't know the prices, I don't
16 know the distribution system, so I cannot --
17 it's impossible to estimate something
18 econometrically. It's literally -- without the
19 data you cannot estimate something, so I
20 literally -- just literally could not do it.

21 And then second is the data that I do
22 have in Figure 3.4 show that there is at least
23 some relationship between the initial shipments
24 and the post-2010 increase.

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1 Now, as I said, these wouldn't line up
2 one-for-one across counties so you wouldn't
3 explain 100 percent of the differences based on
4 just the shipments pre-2010. There are clearly
5 other factors going on.

6 I don't -- because I don't have any
7 data on them, I don't have any capacity to
8 empirically test whether there was some other
9 change that would have been involved in
10 increasing the extent of illegal markets.

11 BY MR. KNAPP:

12 Q. You didn't run a regression between --
13 that would show -- strike that.

14 You didn't run a regression that would
15 show the relationship between pre-2010 shipments
16 and the sophistication of drug networks or the
17 thickening of drug networks after 2010, correct?

18 MR. KO: Object to the form.
19 Objection, asked and answered.

20 A. I wish I had data for many purposes,
21 many academic purposes. I wish I had data on
22 the presence and sophistication of drug networks
23 in different areas. It would be enormously
24 valuable as an academic to be able to study

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1 those, to be able to provide advice to local
2 authorities about what those are and how to
3 address them. Unfortunately, those data just
4 don't exist anywhere, and so I'm just not able
5 to do any econometric analysis.

6 BY MR. KNAPP:

7 Q. And so you couldn't -- well, strike
8 that.

9 Did you consider a hypothesis that
10 before 2010, the break in the market in 2010,
11 that increased shipments of opioids created a
12 thinning in the sophistication and presence of
13 drug networks?

14 MR. KO: Object to the form.

15 A. One of the -- one of the fascinating
16 things -- again I want to come back to Figure
17 3.4. One of the very interesting things is that
18 there does not seem to be a differential trend
19 in the heroin death rate in areas where opioid
20 shipments were higher versus areas where they
21 were lower, so those trends are very similar
22 trends.

23 And so while I don't have the data, as
24 we were talking about, I don't have the data on

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1 the presence or sophistication or any other
2 features of the drug networks, I don't see any
3 differences in the primary outcome that I have,
4 which is the mortality rate differently in some
5 areas than in other areas prior to that point.

6 BY MR. KNAPP:

7 Q. So if we look at Figure 3.4, you've
8 got the different curves for low shipment
9 counties and high shipment counties. At the
10 end, after you run your regression and plot --
11 and apply your shipment coefficient, you're not
12 applying a different coefficient for high
13 shipment counties or low shipment counties,
14 right?

15 A. Can you just refer specifically to
16 which regression you're referring to?

17 Q. Let's look at 3.10, Table 3.10 on
18 Page 64. Let's look at column D. This is your
19 shipment coefficient from your regression,
20 right?

21 A. Yes, that is correct.

22 Q. What does that reflect?

23 A. That -- what column D shows is the
24 impact of -- excuse me -- of additional

<p style="text-align: right;">Page 421</p> <p>1 MR. KO: You've got to -- that's fine. 2 BY MR. KNAPP: 3 Q. We already talked about the Evans 4 study, so let me -- let me ask you about the 5 Alpert study. 6 A. Okay. 7 Q. Do you believe that the Alpert study 8 concludes that shipments of opioids, legal 9 opioids, prior to 2010 caused the increase in 10 heroin mortality after 2010? 11 A. I believe the Alpert study shows that 12 the use of opioids, legal opioids prior to 2010 13 then created conditions under which making 14 OxyContin more difficult to obtain led to an 15 increase in post-2010 heroin mortality. 16 So it was -- there were confluence of 17 two events; the high shipments of opioid 18 mortality as well as the reformulation, and it's 19 those two together that lead to the -- that they 20 conclude leads to the heroin epidemic. 21 Q. And Alpert doesn't seek to 22 differentiate the contribution to the increase 23 in heroin mortality between pre-2010 shipments 24 versus the reformulation of OxyContin, right?</p>	<p style="text-align: right;">Page 423</p> <p>1 which is on Page 18, Table 2 is estimating a 2 model where the dependent variable is the heroin 3 mortality rate per 100,000, and -- excuse me. 4 The change in the heroin death rate per 100,000. 5 And then what they're relating that to in the 6 table is the initial rate of OxyContin misuse, 7 which they're drawing from the NSDUH survey, 8 NSDUH survey. 9 And so they're showing directly that 10 the initial rate of misuse of OxyContin is 11 positively and statistically significantly 12 associated with increases in deaths, heroin 13 deaths. Panel A is showing any heroin death, 14 and Panel B is showing heroin only deaths, so 15 that is deaths where heroin is the only 16 identified substance. 17 Q. So this is showing a relationship 18 between misuse of OxyContin and heroin deaths, 19 correct? 20 A. Yes, that's correct. 21 Q. And are you assuming that misuse of 22 heroin -- strike that. 23 Are you assuming that misuse of 24 OxyContin is a proxy for shipments?</p>
<p style="text-align: right;">Page 422</p> <p>1 MR. KO: Object to the form. 2 Go ahead. 3 A. In this case the two go -- in this 4 case the two are synergistic in that it is both 5 the high level of OxyContin prior to 2010 and 6 the reformulation that are showing up. 7 So it's -- I think yesterday we were 8 talking a little bit about what -- economically 9 what happens when multiple things have to happen 10 for something bad to occur. And in this case 11 Alpert, et al are saying that multiple things 12 happened that led to the heroin mortality 13 increase. 14 MR. KNAPP: All right. Let's mark 15 Cutler Exhibit 10, which is the Alpert study in 16 your footnote 37. 17 (Whereupon, Cutler Exhibit Number 10 18 was marked for identification.) 19 BY MR. KNAPP: 20 Q. Can you identify where in this study 21 you believe that Alpert, et al attribute the 22 increase in heroin deaths after 2010 to pre-2010 23 shipments? 24 A. If you look in Table 2 of the paper,</p>	<p style="text-align: right;">Page 424</p> <p>1 A. In the online appendix to the paper, 2 so not -- it's not physically in what is Cutler 3 Exhibit 10. In the online appendix to the paper 4 they have a chart that shows that explicitly. 5 So they show that the OxyContin misuse rate is 6 positively and statistically significantly 7 related to the shipments of opioids in the area. 8 But you'd need to pull up the online appendix to 9 see that. 10 Q. And what is the analysis that they 11 run? Is it a regression analysis between 12 OxyContin shipments and OxyContin misuse? 13 A. They present a figure showing the 14 cross-state relationship between the two. I 15 can't remember whether they present the 16 regression analysis, but I believe they show 17 what the regression line is, so it's very clear 18 what that looks like. 19 Q. Are there any other studies that you 20 rely on for your statement in Paragraph 55 that 21 the shift in the relationship between shipments 22 of prescription opioids and mortality has been 23 widely recognized in the economic literature? 24 A. Those are the two studies that I rely</p>

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1 reference to both the Alpert, et al study, the
2 Evans, et al study, and Figure 3.4. So all of
3 those show that the specific act of increasing
4 the price of opioids and reducing the ability to
5 get opioids, raising the cost in other ways, led
6 to an increased -- increased demand for illegal
7 opioids.

8 Because I don't have data on the exact
9 consumption of heroin, I cannot estimate a
10 demand curve directly. So that would, of
11 course, be -- the ideal would be to have data on
12 the consumption of heroin and other illegal
13 drugs across different areas. And I don't have
14 that, so I don't have a demand curve.

15 So here what I'm doing is I'm using
16 sort of economic analysis to say that the impact
17 of the price increase, in essence, which is
18 what's shown in all of those analyses, led to
19 a -- would have led to an increase in demand for
20 substitutes.

21 BY MR. KNAPP:

22 Q. You're looking at mortality from
23 illegal opioids as a proxy for demand, right?

24 A. What I'm doing here, yes. In

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1 addition, the Alpert, et al paper shows that
2 there's a relationship with people reporting
3 heroin use disorder on the NSDUH survey, and so
4 that's another measure of opioids -- of use of
5 illegal opioids.

6 Q. Did you consider that the demand for
7 opioids may have stayed flat, but the toxicity
8 of heroin increased?

9 A. So a couple of points. One is the
10 toxicity increase may very well have been a
11 result of the increased demand.

12 But second, I think the Alpert -- so,
13 again, I'm not looking specifically at the
14 numbers of people, but the Alpert, et al paper
15 does look at the numbers -- does look at the
16 heroin OUD population, the heroin disorder
17 population, and does show an increase there.

18 Q. You would agree, sir, that the sharp
19 increase in heroin mortality after 2010 was due
20 at least in part to the introduction of
21 fentanyl, illegal fentanyl?

22 A. I think the sentence that you said I
23 don't agree with. So I -- the sentence that I
24 heard you say is the increase in heroin

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1 mortality after 2010 is due to the sharp
2 increase in illegal fentanyl. That -- that
3 sentence I don't agree with.

4 Q. Let me ask the question again.

5 You would agree that the sharp
6 increase in deaths from illicit opioids is in
7 part attributable to the introduction of illegal
8 fentanyl after 2010?

9 A. Yes. The introduction of illicit
10 fentanyl after 2010, particularly later on after
11 2013 or 2014, is a very big component that I
12 believe is also driven by people's -- by the
13 demand that was initially created by the
14 widespread availability of licit opioids.

15 So as people were addicted to those
16 opioids, licit, legal opioids, and then the
17 cost, both monetary and price and time and so
18 on, of obtaining those drugs increased, people
19 shifted into illegal markets.

20 The first illegal market that occurred
21 was a shift into heroin, which is where one sees
22 the heroin mortality rate first, and then over
23 time it then shifted into fentanyl. And I
24 believe, based on the types of analyses that are

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1 done in these studies, that those are all of a
2 continuum.

3 Q. You're not able to quantify the impact
4 that the introduction of illicit fentanyl had on
5 the number of deaths from illegal opioids after
6 2010, correct?

7 MR. KO: Object to the form.

8 A. Unfortunately, no one has data -- with
9 any illegal market, no one has data on the total
10 quantity. So just as we don't have data on the
11 total quantity of heroin, we don't have data on
12 the total quantity of fentanyl.

13 But I also want to come back, I don't
14 think the introduction of fentanyl was a sort of
15 out-of-the-blue event; that is, I believe it is
16 responding to the substitution to the fact that
17 people were addicted to prescription opioids,
18 and then they migrated over. And so in this
19 case, as in many markets where there's a demand,
20 that then leads to supply to enter, and that's,
21 I believe, what's happening here.

22 Q. Do you agree that the increase in
23 deaths from illicit opioids after 2010 is due in
24 part to the introduction of carfentanil?

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1 A. I think I have the same answer here,
 2 which is that I don't have data to test that
 3 econometrically, so I'm not giving -- I'm not
 4 offering an opinion about that econometrically.
 5 Obviously that is a source of death in
 6 the death records, so that's -- it's very, very
 7 clear that people are using it and unfortunately
 8 dying from it. I believe that the use of
 9 carfentanil is related to the fact that people
 10 were addicted to prescription opioids and then
 11 transitioned into illegal opioids over time.
 12 Q. If you were submitting an article for
 13 submission to -- well, strike that.
 14 If you were submitting an article to
 15 an academic journal, would you try to cite all
 16 of the papers that both supported and
 17 potentially contradicted the conclusions that
 18 you were drawing?
 19 A. Yes, as a general matter, one would
 20 want to refer to all papers that have addressed
 21 the subject.
 22 Q. And you've read some papers that
 23 contradict or don't agree with the conclusions
 24 that you've drawn in your report, right?

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1 MR. KO: Object to the form.
 2 Which conclusions?
 3 A. I think I'd want you to be a little
 4 more specific about any particular conclusion
 5 you're referring to.
 6 BY MR. KNAPP:
 7 Q. Any conclusion that you have in your
 8 report.
 9 MR. KO: Any single one in the entire
 10 report, Tim?
 11 BY MR. KNAPP:
 12 Q. You can answer.
 13 A. In the report I do point out some of
 14 the debates that people have. And you asked me
 15 about it yesterday, which was completely fair.
 16 For example, I noted the discussion of
 17 the Case and Deaton analyses about the deaths of
 18 despair and the debate in the literature about
 19 the importance of deaths of despair relative to
 20 other causes of increased drug deaths so --
 21 other causes of increased deaths from opioid
 22 drugs. So that's at least one example where I
 23 tried to be very clear about what the economic
 24 issues and debates are, and then do analyses to

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1 address that. So I think I tried to do that in
 2 all the areas in which I'm an expert.
 3 Q. Any other studies that you can
 4 identify that potentially contradict or don't
 5 agree with the conclusions you've drawn in your
 6 report?
 7 MR. KO: Object to the form.
 8 A. No. What I'd really like to do is
 9 look through every article that I cite and to --
 10 many of them will, for example, agree in parts
 11 and disagree in other parts, or they'll do
 12 something a little bit differently than I do in
 13 the report, and I still cite them.
 14 For example, I'll just take another
 15 example just because it comes to mind, I've
 16 cited articles on trends in crime over time that
 17 talk about and identify a number of factors that
 18 would be leading to trends in crime over time,
 19 not all of which are the opioid ones, and some
 20 reach different conclusions about things. So as
 21 I think about it, I tried to be -- I did not go
 22 into it with a bias of citing only articles that
 23 supported my conclusion.
 24 BY MR. KNAPP:

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1 Q. Okay. We'll talk about the Case and
 2 Deaton articles later this morning.
 3 A. Okay.
 4 Q. But I want to take a break after this
 5 question, but I do want to ask you it before we
 6 take a break.
 7 Do you believe that Professor
 8 Rosenthal's model meets the standard for
 9 submission to a peer-reviewed academic journal?
 10 A. Yes, I --
 11 MR. KO: Objection. Scope.
 12 But go ahead.
 13 A. Yes, I do believe Professor
 14 Rosenthal's article meets the standard for
 15 submission to an academic journal.
 16 MR. KNAPP: Okay. Let's take a break.
 17 THE VIDEOGRAPHER: The time is
 18 9:24 a.m., and we're off the record.
 19 (Whereupon, a recess was taken.)
 20 THE VIDEOGRAPHER: The time is
 21 9:42 a.m., and we're on the record.
 22 BY MR. KNAPP:
 23 Q. So, Professor Cutler, I want to make
 24 sure I understand sort of how far your

<p style="text-align: right;">Page 437</p> <p>1 thickening theory goes. So let's imagine a 2 scenario where there's a factory in China 3 sometime next year develops a new, stronger form 4 of opioid, stronger than carfentanil, stronger 5 than fentanyl. Under your theory and under the 6 opinions you offer in this case, are the 7 defendants responsible for the deaths resulting 8 from that opioid?</p> <p>9 MR. KO: Object to the form.</p> <p>10 A. So let me give you what the evidence 11 shows. There were obviously people -- not 12 obviously. There were people who became 13 addicted to prescription opioids in the course 14 of the 2000s. That -- those people, once they 15 were addicted, were then -- had strong demand 16 for opioids. As it became more difficult to 17 obtain those legally, people moved into illegal 18 substances, first heroin and then fentanyl.</p> <p>19 There are two aspects of the -- that 20 shift that are directly related to the 21 misconduct on the part of the defendants. The 22 first -- and in the example you cite.</p> <p>23 The first is the demand; that is, 24 creating a product for which there is no demand</p>	<p style="text-align: right;">Page 439</p> <p>1 literature that new products are created in 2 response to demand. The leading -- so that is 3 one would not be looking for a new product in 4 the absence of demand.</p> <p>5 In this third part, the leading 6 industry for which that evidence is cited is the 7 pharmaceutical industry where the pharmaceutical 8 industry responds quite appropriately to demand 9 from individuals for relief from certain 10 diseases or illnesses, and then develops 11 medications that respond to that.</p> <p>12 And so it is also possible -- I have 13 not done an economic analysis, but it is 14 absolutely theoretically possible that the 15 development of new types of opioids, legal or 16 illegal, would be a response to the demand that 17 was brought about by the misconduct on the part 18 of the defendants.</p> <p>19 BY MR. KNAPP: 20 Q. And so let's take another 21 hypothetical. Let's say in 50 years another 22 factory, a different factory in China comes up 23 with yet a stronger form of opioid. No one can 24 anticipate it at this point, but it's stronger</p>
<p style="text-align: right;">Page 438</p> <p>1 will lead to no sales. So deaths that result 2 from the fact that there are people who became 3 addicted and then had demand for illegal 4 opioids, that part is attributable to the 5 defendants' misconduct.</p> <p>6 In addition, the extent of the 7 delivery markets, possibly the -- possibly the 8 reason for developing it, although not -- well, 9 let me list that as a third possible reason.</p> <p>10 So the second one is the extent of the 11 markets that then bring that delivery to people, 12 those -- the extent of those -- that bring that 13 new type of fentanyl to people. Those markets 14 are thicker because of the demand that was 15 created by the misconduct on the part of the 16 defendants.</p> <p>17 And so that thickness of the market 18 then allows any new innovation, a new type of 19 opioid, to be brought in, if you will, more 20 efficiently; that is, at lower cost, in greater 21 quantities, distributed in easier ways, perhaps 22 people being more willing to take it who might 23 otherwise not be willing to take it.</p> <p>24 Third, there is some economic</p>	<p style="text-align: right;">Page 440</p> <p>1 than anything that's on the market now. Under 2 your theory, are the defendants responsible for 3 the deaths that would result from that new 4 opioid product?</p> <p>5 MR. KO: 50 years from now or 50 years 6 from 2010?</p> <p>7 Object to the form.</p> <p>8 A. One would need to do an economic 9 analysis. So some technological innovation 10 comes out of the blue. So, for example, if one 11 comes back to the pharmaceutical example, some 12 pharmaceuticals just happen because a scientist 13 is looking at something and she or he discovers 14 that a compound they were looking at has an 15 effect on the part of the body that they never 16 thought about, that they never anticipated, and 17 so that comes out of the blue, and that's an 18 important form of scientific advance.</p> <p>19 Some other innovation occurs in 20 response to demand; that is, there are a number 21 of people suffering from a particular type of 22 cancer which is currently not able to be treated 23 well, and pharmaceutical companies then devote 24 resources and scientists' ability and effort to</p>

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1 thickening theory, are defendants responsible
2 for deaths associated with cocaine use?

3 MR. KO: Objection. Asked and
4 answered.

5 A. I'm not making a theoretical statement
6 about that. There are arguments in the
7 literature about, as we were talking about
8 yesterday, about gateway drugs. I'm actually
9 not -- so I actually don't want to make it be a
10 theoretical discussion, unless you want to ask
11 about it theoretically. I will just say as an
12 empirical matter, the model does not attribute
13 deaths from cocaine to the misconduct of the
14 defendants.

15 BY MR. KNAPP:

16 Q. Sitting here today, you're not willing
17 to rule out the possibility that defendants are
18 responsible for increases in deaths associated
19 with cocaine?

20 MR. KO: Objection. Asked and
21 answered.

22 A. In my model, there is no impact at all
23 of deaths from cocaine on the harms due to
24 defendants. So it's not in the data. It's not

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1 in the results. It's not in the conclusions
2 that I draw.

3 BY MR. KNAPP:

4 Q. Well, you said if I want to have a
5 theoretical discussion, you would have it, so
6 let me ask you as a matter of theory.

7 Under your thickening theory, are
8 defendants responsible for increases in deaths
9 associated only with cocaine?

10 A. So there is theoretical work that has
11 been done. I have not seen -- ultimately this
12 is then an empirical question as to whether
13 people transition from opioids to cocaine -- or
14 whether -- excuse me, whether opioids are, in
15 essence, a gateway drug to cocaine. I do not
16 know of any empirical literature on that at all.

17 So all -- I can tell you that it's a
18 theory, and I could tell you arguments as to why
19 it would be, and I could tell you arguments why
20 it wouldn't be. Ultimately, as an applied
21 economist, one needs to see empirical evidence,
22 and there is no evidence on it that I know of.

23 Q. When did the market in Cuyahoga County
24 begin thickening, under your theory?

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1 MR. KO: Object to the form.

2 A. Begin thickening I don't have an
3 answer to because I cannot measure how thick the
4 market is. So I would love to have data on the
5 extent of the market for illegal drugs in
6 different areas over time, that's what I would
7 love to have, and then I could give you an
8 empirical analysis because I could plot that and
9 I could show you where the breaks were, where
10 the breaks in that were. I don't have an
11 estimate of that because those data do not
12 exist.

13 The only thing I can tell you is about
14 heroin and other illegal drugs, what happens to
15 the death rates. That's the only thing I can
16 tell you. We were looking at those earlier, and
17 so you saw what those trends looked like. But I
18 don't have an empirical way of answering your
19 question.

20 BY MR. KNAPP:

21 Q. How much thicker was the illegal drug
22 market in Cuyahoga County in 2010 than it was in
23 1995?

24 A. So, again, you're asking an empirical

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1 question to which I would love to know the
2 answer. I would love to know the answer as an
3 economist. I would love to know the answer as a
4 public policy person. I would love to have a
5 measure of the amount of illegal -- the amount
6 of use of illegal opioids over time.

7 Unfortunately, I don't have that.

8 So the equivalent of the ARCOS data is
9 what one would want in order to have that, and
10 there just is nothing like that that indicates
11 the extent of the illegal market.

12 Q. Let's turn to Paragraph 47 of your
13 report. In your regression models you use --
14 well, strike that.

15 In the way that you apply your
16 regression models, you use mortality as a proxy
17 for the other harms that you analyzed, right?

18 MR. KO: Which regression models?

19 Object to the form.

20 A. There are different regression models.
21 In some of the regression models I use mortality
22 as a proxy for other harms. I also present
23 analysis using crime rates as the dependent
24 variable, and in that analysis I do not use

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1 mortality as a proxy for the harms, I'm looking
2 directly at the harms using crime.

3 BY MR. KNAPP:

4 Q. Okay. And in Paragraph 47 you say
5 that crime in foster care -- strike that.

6 In Paragraph 47 you admit that crime
7 in foster care placements would exist at some
8 level even in the absence of opioids, right?

9 A. Yes, that's correct.

10 Q. And so you're admitting that there's a
11 different relationship between foster care and
12 opioid shipments than there is between opioid
13 mortality and opioid shipments, right?

14 A. That's not the distinction I'm making
15 there.

16 Q. Well, let me -- it's a true statement,
17 right, that there's a different relationship
18 between foster care and opioid shipments than
19 there is between opioid mortality and opioid
20 shipments?

21 MR. KO: Object to the form.

22 A. I don't know empirically whether the
23 relationship would be similar or different. So
24 I think you're saying would there be a different

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1 empirical relationship. Because I can't measure
2 the empirical relationship the same way, I can't
3 do a comparison across those and say if they're
4 different.

5 BY MR. KNAPP:

6 Q. How did you factor into your model the
7 fact that you can't model the relationship
8 between opioid shipments and foster care and
9 opioid mortality and shipments?

10 A. As is stated here, I'm using mortality
11 as an estimate of the share of the harms that
12 are due to shipments of opioids, so I'm going to
13 assume that that share of the harms is due to
14 opioids, and that's a fairly -- obviously a very
15 severe form of harm.

16 Similarly, child removal is a very
17 severe form of intervention with a family. It's
18 a very, very big form of intervention with the
19 family.

20 So what I do is I use data on the
21 share of deaths that are a result of opioid
22 shipments to then say I'm going to assume that
23 that same share of children removed from their
24 families because of opioids, that same share is

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1 also due to the opioid shipments as opposed to
2 other reasons why families may be using opioids
3 and then child removals associated with that.

4 Q. Professor Cutler, you can't say with
5 any degree of economic certainty that the
6 correlation between opioid shipments and any
7 categories of harms that you analyzed other than
8 mortality and crime are the same as the
9 relationship between opioid mortality and
10 shipments, right?

11 MR. KO: Object to the form.

12 A. I want to focus on the crime ones for
13 a second because the crime ones I do have the
14 data to estimate directly --

15 BY MR. KNAPP:

16 Q. Sir, my question was other than --

17 MR. KO: Let him finish the answer.

18 BY MR. KNAPP:

19 Q. My question is other than mortality --

20 MR. KO: Tim, you cut him off. Let
21 him finish the answer.

22 BY MR. KNAPP:

23 Q. Do you understand that my question --

24 MR. KO: Tim --

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1 BY MR. KNAPP:

2 Q. -- was other than mortality?

3 MR. KO: Tim, you cut him off. He was
4 in the middle of an answer.

5 BY MR. KNAPP:

6 Q. Okay. I just want to make sure you
7 understand what the question is.

8 MR. KO: Before -- why don't you go
9 ahead and finish your response to the earlier
10 question.

11 A. Okay. With crime, I can do an
12 analysis where I directly estimate the impact of
13 opioid shipments on crime, and then I can
14 compare that to what I get when I look at the --
15 when I do it through using the impact of
16 opioid-related shipments on mortality, and then
17 applying that percentage to the opioid-related
18 component of crimes.

19 And in that case, the direct analysis
20 of the crime effects actually suggest a greater
21 impact of opioid shipments on crime than I get
22 using the more -- using the method through
23 mortality.

24 I cannot do the same for the other

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1 harms because I don't have the data, but I took
2 from the crime analysis that one -- that the
3 results were in the same ballpark, so,
4 therefore, that I took confirmation.

5 And, second, that, if anything, I may
6 be underestimating the effect by looking through
7 the mortality lens as opposed to being able to
8 estimate the direct effect.

9 But that said, I don't have hard and
10 fast empirical data to say with absolute
11 certainty the effect if I could estimate it a
12 different way would be stronger.

13 BY MR. KNAPP:

14 Q. So I want to ask you about the
15 mortality data that you use in your regressions.
16 Did you exclude any counties that qualify as
17 large counties in any of the regressions that
18 you ran?

19 A. There were four counties that were
20 excluded because they had very high -- they are
21 in areas where there was known to be a good deal
22 of transshipment, that is, drugs that were sent
23 to that area and then sent elsewhere, and
24 then -- excuse me, not sent elsewhere, but

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1 people from elsewhere would go to those areas to
2 obtain medication and then either consume it
3 there or take it back to where they were. And
4 they were identified by areas where the
5 shipments per person, so the MME per person,
6 were extremely high relative to the rest of the
7 large counties.

8 Q. One of the counties that you removed
9 was Franklin County, Ohio, right?

10 A. I believe that's correct.

11 Q. How did you determine that there were
12 transshipments out of Franklin County, Ohio?

13 MR. KO: Object to the form.

14 A. What -- so, of course, we don't know
15 about transshipments from each county. What we
16 did was we excluded the four counties that were
17 very appreciable outliers in the shipments per
18 capita, which my theory is that there was a good
19 deal of transshipment, but I do not have a
20 direct estimate of that.

21 BY MR. KNAPP:

22 Q. Were you able to quantify the amount
23 of transshipments out of Cuyahoga or Summit
24 County into other counties of Ohio?

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1 A. No, I was not able to calculate the
2 transshipment from either -- out of either
3 Cuyahoga or Summit.

4 Q. So you didn't make any adjustments for
5 if someone from a neighboring county filled
6 their prescription in Cuyahoga County and then
7 consumed it as a resident of a different county?

8 A. I wasn't able to do that. And, in
9 fact, what that does is it creates measurement
10 error in the independent variable. So if you
11 think about what I would like to do, I would
12 like to relate deaths to use of opioids in that
13 area.

14 What I have is shipments of opioids to
15 the area. Since shipments are not exactly equal
16 to use, there is measurement error; that is, the
17 variable is -- the variable that I'm trying to
18 measure use is measured with error, that is
19 shipments.

20 As is standard in models with
21 measurement error, this will lead to my
22 coefficient being too low; that is, it will
23 attribute fewer deaths to opioid use than would
24 happen correctly, so that the percentages that I

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1 estimate because of this from the direct model
2 are actually lower than would be the case if I
3 did -- if I had the ideal data.

4 Q. Would you agree that for counties that
5 are a center of a metropolitan area with a
6 number of surrounding more rural counties, you
7 might expect that people from the rural counties
8 would come into the urban county to fill
9 prescriptions?

10 MR. KO: Object to the form.

11 A. Yes, it's possible that people from
12 rural areas -- of course, it would depend a lot
13 on the characteristics of the area, but it is
14 possible.

15 BY MR. KNAPP:

16 Q. So would you expect higher per capita
17 shipments in those types of counties because the
18 county population would understate the
19 utilization?

20 MR. KO: Object to the form.

21 A. In the hypothetical that you're
22 giving, or in the example that you're giving, it
23 is the case that the shipments to the area are
24 only a noisy measure of the use in the area,

<p style="text-align: right;">Page 477</p> <p>1 record that you left off some of that statement. 2 But go ahead. 3 BY MR. KNAPP: 4 Q. Let me read it again just to make sure 5 we get it exactly right. 6 MR. KO: Thank you. 7 BY MR. KNAPP: 8 Q. It says, "In their current paper, 9 their emphasis has changed a bit. Rather than 10 emphasizing the supply of pills, they now focus 11 on the social and economic circumstances that 12 lead people to take them." 13 Do you see that? 14 A. Yes, I do see that. 15 Q. And then you go on to say, "Their 16 overall suggestion is very much in the tradition 17 of ?mile Durkheim. People despair when their 18 material and social circumstances are below what 19 they had expected." 20 Do you see that? 21 A. Yes. And, actually, just on the 22 French, it's actually ?mile. 23 Q. Thank you. I appreciate that. 24 A. He was a great --</p>	<p style="text-align: right;">Page 479</p> <p>1 strike that. 2 Do you agree that despair leads people 3 to act in ways that significantly harm their 4 health? 5 A. Again, here I'm giving their 6 description which is based on Durkheim, and so 7 that's a very common view. Again, I don't want 8 to -- I don't want to pretend to be an expert in 9 psychology and to say I know all of the 10 literature that explains despair and I've read 11 all of the literature and so on. That's not an 12 expert that I am. So this is really a summary 13 of their -- of theirs for which I'm pointing out 14 the relationship with other studies in the 15 literature. 16 Q. Well, if we look at the first sentence 17 of the next paragraph, you say, "This 18 explanation is certainly correct," right? 19 A. That's correct. 20 Q. So in this comment that you wrote in 21 2017, you said that Case and Deaton's 22 explanation about despair was certainly correct, 23 right? 24 A. Yes. And by "this," I'm referring, of</p>
<p style="text-align: right;">Page 478</p> <p>1 Q. I'm not a French speaker. 2 A. He was a great -- I'm not a French 3 speaker either. But he was a great scholar. 4 MR. KO: From 1897. 5 BY MR. KNAPP: 6 Q. Do you agree with that, that people 7 despair when their financial and social 8 circumstances are below what they had expected? 9 A. So I'm giving this as an explanation 10 of their -- as an explanation of what they're 11 saying. I'm not an expert in psychology. If 12 you -- in general, that is what the Durkheim 13 theory is, which is that despair is a product of 14 having unmet expectations, so not -- having 15 expectations that are not fulfilled. 16 And so that's -- that is their theory, 17 that is a very, very common theory, and it's one 18 that has come up in my work, for example, on 19 youth suicide. I don't want to testify that I 20 am an expert on psychology theories. I hope 21 that distinction makes sense to you. 22 Q. It does. 23 A. Okay. Thank you. 24 Q. So the next sentence goes on -- well,</p>	<p style="text-align: right;">Page 480</p> <p>1 course, to -- at least a part of it is a 2 response to that; that is, it is certainly 3 correct for some part. 4 Q. And what Case and Deaton says is that 5 at root of this despair is economic and social 6 breakdown, right? 7 A. That's correct. They put a lot of 8 emphasis on economic and social breakdown. 9 Q. And when you say the explanation is 10 certainly correct, what you're referring to, 11 that the root cause of the despair is economic 12 and social breakdown, right? 13 A. I'm not referring to all of it. I'm 14 saying that the theory that economic and social 15 breakdown leads people to despair and that they 16 then act in ways that may be harmful, for 17 example, through heavy drinking, smoking, drug 18 abuse, not taking preventive medications, and so 19 on, that that is certainly correct at least in 20 part. It's not -- I'm not making a quantitative 21 statement here about do I think that's the 22 entire explanation or what percentage of an 23 explanation do I think that is. 24 Q. You agree that there's no way to</p>

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1 understand the mortality pattern or changes in
2 mortality without considering sources of
3 despair, right?

4 MR. KO: Object to the form.

5 A. That is correct. One absolutely needs
6 to consider despair in looking at mortality
7 patterns.

8 BY MR. KNAPP:

9 Q. And you agree that the source of
10 despair -- strike that.

11 You agree that the sources of despair
12 are very deep-seated indeed, right?

13 A. Yes.

14 MR. KO: Object.

15 THE WITNESS: Oh, I'm sorry.

16 MR. KO: Go ahead.

17 Object to the form.

18 But go ahead.

19 A. Yes, that's correct.

20 BY MR. KNAPP:

21 Q. And in their paper Case and Deaton
22 discuss where despair may be coming from, and
23 you suspect that there may be merit in their
24 discussion there as well, right?

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1 A. Yes, that is correct.

2 Q. All right. I want to mark as Cutler
3 Exhibit 12 a short paper called "Deaths of
4 despair redux: a response to Christopher Ruhm."
5 It's by Case and Deaton dated January 8, 2018.
6 (Whereupon, Cutler Exhibit Number 12
7 was marked for identification.)

8 BY MR. KNAPP:

9 Q. Cutler Exhibit 12 is a response that
10 Professors Case and Deaton wrote to --

11 A. Case and Deaton.

12 Q. -- Case and Deaton wrote in response
13 to a paper by Christopher Ruhm, right?

14 A. Yes, that is correct.

15 Q. And that's a paper by Christopher Ruhm
16 that you relied on in connection with your
17 report, right?

18 A. Yes, that's correct.

19 Q. And Professors Case and Deaton do not
20 agree with the conclusions that Professor Ruhm
21 drew, is that right?

22 MR. KO: Object to the form.

23 A. It's actually a more subtle conclusion
24 than that. Professor Ruhm was saying that he

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1 was going to test the hypotheses of Case and
2 Deaton by looking at what he called medium-run
3 changes in economic conditions which also
4 include social conditions, so think about it as
5 a group, by testing medium-run changes.

6 He estimated models for changes in
7 mortality similar to the models that I present
8 in this report relating mortality changes to
9 economic and social conditions, and he concluded
10 from that that economic -- changes in economic
11 and social conditions did not have a significant
12 impact on mortality due to drug use.

13 He then interpreted that as a
14 rejection of the theory that Case and Deaton put
15 forward saying that, therefore, it's not due to
16 despair.

17 What Case and Deaton are pointing out
18 in this note is two things. First they're
19 saying we had done the regressions that
20 Professor Ruhm did, and, in fact, we reached the
21 same conclusion, that we cannot explain the
22 mortality change with the economic factors that
23 Professor Ruhm looks at and we, Case and Deaton,
24 did that and we agree with that and he's

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1 confirming our analysis.

2 But second they're saying the part
3 that they disagree with him is they're disputing
4 that that is a test -- is a fully accurate way
5 of testing all the theory that they're putting
6 forward. So they think that the long-run social
7 and economic conditions have an impact and not
8 just the medium-run conditions.

9 So what they're disputing is whether
10 the results of Professor Ruhm, which they agree
11 with, challenge their broader conclusion which
12 Professor Ruhm says it rejects, or whether that
13 broader hypothesis has not been adequately
14 tested by Professor Ruhm.

15 Q. And if we turn to Page 2, final full
16 paragraph, first sentence, Case and Deaton say,
17 "This is much more" -- emphasis on much more --
18 "than economic circumstances and goes back
19 much" -- emphasis on much -- "much further than
20 1999."

21 Do you see that?

22 A. Yes, I do see that.

23 Q. You agree that increases in mortality
24 in the '90s and the 2000s is about much more

<p style="text-align: right;">Page 485</p> <p>1 than economic circumstances and goes back much 2 further than 1999, right?</p> <p>3 A. They're putting forward a hypothesis 4 here, and their hypothesis is that despair is 5 driven by circumstances that are not just 6 medium-term circumstances, that are not just 7 economic and social and demographic change from 8 1999 to 2015, but that they're a result of a 9 lifetime of events. So that's the hypothesis 10 that they're putting forward.</p> <p>11 As a hypothesis, I think that's a 12 perfectly valid hypothesis. I think that's a 13 very important and interesting hypothesis. They 14 don't have any data that says that that 15 hypothesis is true.</p> <p>16 So what this is here, this is really a 17 statement of their belief about the appropriate 18 theory and why they think that Professor Ruhm's 19 characterization of his results as rejecting 20 their theory is not right. They're restating 21 their theory and that their theory is not just 22 related to results from -- to economic and 23 demographic changes from 1999 on.</p> <p>24 Q. Just like Case and Deaton, you also</p>	<p style="text-align: right;">Page 487</p> <p>1 some of the specific things that one would want 2 to get at.</p> <p>3 I do think that some of the variables 4 that are included in the model are likely to 5 pick up some of these long-term issues, and, in 6 fact, part of the reason for including them in 7 the model is that they would pick up some of 8 these long-term factors that may be driving 9 people's sense of themselves.</p> <p>10 Q. You would agree that it's hard to 11 control for these non-economic factors that lead 12 to despair, right?</p> <p>13 A. I wouldn't say it as hard to control 14 for non-economic factors. There are many 15 factors that are non-economic that one can 16 control for. For example, population 17 distributions are not strictly economic, they're 18 more demographic and they can be controlled for.</p> <p>19 The real issue is whether there is a 20 variable that one can accurately measure, and 21 some of the variables that one would want to 22 include are not variables that we can measure 23 either at all or over any period of time.</p> <p>24 Q. So those are variables that you</p>
<p style="text-align: right;">Page 486</p> <p>1 don't have data to say whether their theory that 2 these deaths -- increase in deaths in the '90s 3 and 2000s are related to deep-seated social and 4 demographic circumstances?</p> <p>5 A. I wish I had the ability as a scholar 6 and a human being to test that. They were 7 unable to test it fully in their work. They 8 showed some correlations. They were unable to 9 test it fully in their work. I wasn't able 10 to -- I did not have access to any data they did 11 not have access to.</p> <p>12 Q. So in your regression model, you were 13 not able to control for the fact that despair 14 and deaths resulting from despair may go back 15 much further than 1999, right?</p> <p>16 MR. KO: Objection to form. 17 Which regression model.</p> <p>18 A. Could you just indicate which 19 regression model you're referring to?</p> <p>20 BY MR. KNAPP:</p> <p>21 Q. Stick with the direct regression.</p> <p>22 A. So I want to give two answers, which 23 is why I turned to this specific page. The -- I 24 don't have data to test many of the specific --</p>	<p style="text-align: right;">Page 488</p> <p>1 wouldn't be able to and didn't control for in 2 your direct regression model, right?</p> <p>3 A. That is correct. And in this case I'm 4 explicitly hoping that they are correlated with 5 the variables that we included in the direct 6 model so that the effect of those variables in 7 the direct model will be picking up those other 8 characteristics that we cannot directly measure.</p> <p>9 Q. I understand that's what you're 10 hoping. But you can't say with any degree of 11 reasonable economic certainty that the variables 12 you included would pick up these other 13 non-economic variables of despair?</p> <p>14 MR. KO: Object to the form.</p> <p>15 A. Without data, one can never say for 16 sure whether a variable that's not included 17 would affect the results or not, so I have no 18 way to say for sure about that.</p> <p>19 I just want to make clear that you say 20 non-economic variables, that is not -- it's 21 really non-measured variables. And the 22 distinction is not between economic and 23 non-economic. Anything that we could measure 24 that either we hypothesized or other studies</p>

<p style="text-align: right;">Page 489</p> <p>1 hypothesized would be related to mortality is 2 included.</p> <p>3 The only things that are not here are 4 variables that we simply could not measure 5 regardless of whether they're economic or social 6 or demographic or psychological or anything 7 else.</p> <p>8 BY MR. KNAPP:</p> <p>9 Q. So let's look at -- stay with this 10 paragraph of Cutler Exhibit 12. Case and Deaton 11 say, "In our paper we talk about morbidity as 12 well as mortality, and while we recognize the 13 deterioration in wages for those without a BA, 14 we also focus on the decline in labor force 15 participation."</p> <p>16 Do you see that?</p> <p>17 A. Yes, I do see that.</p> <p>18 Q. Did you control for decline in labor 19 force participation in your model?</p> <p>20 A. Actually, yes. So what we have is -- 21 it's picked up in several ways. So we have the 22 change in the employment ratio, so that's the 23 share of the population that's unemployed -- 24 excuse me, excuse me -- that is the share of the</p>	<p style="text-align: right;">Page 491</p> <p>1 long-term decline in marriage rates?</p> <p>2 A. I believe -- I would want to check 3 100 percent. I believe the reason why we didn't 4 include that would be because the long-term data 5 on marriage rates are not available at, say, at 6 the county level, but I would just want to check 7 that to be sure.</p> <p>8 Q. The next one is the rise of 9 cohabitation. Did you include a variable to 10 control for the rise of cohabitation in any of 11 your regressions?</p> <p>12 A. It's again something that we weren't 13 able to measure over a long period of time.</p> <p>14 Q. Let me go back to the decline in 15 marriage rates. Would you agree that the 16 decline in marriage rates may have an impact on 17 the increase in mortality in the '90s and the 18 2000s?</p> <p>19 A. It's a hypothesis that the decline in 20 marriage rates could have an impact on mortality 21 in the 1990s and 2000s.</p> <p>22 Q. And to the extent that it did have an 23 impact and is not correlated with the variables 24 you considered, then your regression may</p>
<p style="text-align: right;">Page 490</p> <p>1 population that's employed.</p> <p>2 We also have the percentage -- the 3 change and the level in the percent of the 4 population that's unemployed. So together those 5 two will give us the labor force participation 6 rate. We decided to separate it into the 7 employed and the unemployed to allow a little 8 bit more freedom for the regression to think 9 about them differently.</p> <p>10 We also have the levels of those. So 11 you can see up above we have the level of the 12 employment ratio, and we have the percent that's 13 unemployed. And then, of course, we have the 14 demographics, so anything about changes in labor 15 force related to demographics would be included 16 in there as well.</p> <p>17 Q. The next one is the decline in 18 marriage rates. Did you control for that in any 19 of your regressions?</p> <p>20 A. We -- so what they're talking about 21 are long-term declines in marriage rates, and we 22 do not have a long-term decline in marriage 23 rates in here.</p> <p>24 Q. Was the data available for the</p>	<p style="text-align: right;">Page 492</p> <p>1 overstate, understate, or have no effect on the 2 causal relationship that you draw?</p> <p>3 MR. KO: Objection. Asked and 4 answered.</p> <p>5 A. That's correct. If it -- if it -- the 6 component of that that's not related to what's 7 included here could have an impact on the 8 regression, and it could lead the impact of the 9 shipments variable to go up, to go down, to be 10 the same.</p> <p>11 BY MR. KNAPP:</p> <p>12 Q. So I have the same question about the 13 rise of cohabitation. To the extent that it has 14 an impact on mortality rates and is not 15 correlated with the variables you included, that 16 it could increase or decrease or have no effect 17 on the causal relationship that you draw in your 18 direct regression, right?</p> <p>19 A. Just qualifying that, the part of the 20 change in the cohabitation rate, that would not 21 be related. So anything about changing in 22 cohabitation that's also related to these, the 23 impact of that would be picked up.</p> <p>24 So it would be other exogenous changes</p>

<p style="text-align: right;">Page 525</p> <p>1 On the later end, the averaging -- so</p> <p>2 there's not a scientific criteria. There's not</p> <p>3 a test statistic that one could use to determine</p> <p>4 which years you should average over. I wanted</p> <p>5 to end in 2010 for the reasons that we've spoken</p> <p>6 about having to do with the transition from</p> <p>7 legal opioid deaths to illegal opioid deaths.</p> <p>8 I didn't want to go too far back</p> <p>9 because then you're missing, of course -- you're</p> <p>10 sort of averaging in years where there's a</p> <p>11 smaller effect, and one doesn't want -- where</p> <p>12 the effects are still ongoing and building up,</p> <p>13 and one doesn't want to do that.</p> <p>14 So two years seemed like it was a</p> <p>15 natural compromise between doing just one year,</p> <p>16 which exposes one to the random fluctuations in</p> <p>17 coding and just other random causes, and going</p> <p>18 back many more years which would cut out some of</p> <p>19 the impact one wishes to measure.</p> <p>20 Q. Did you run the model with more years</p> <p>21 on the back end, for example, 2008 to 2010?</p> <p>22 A. I don't know that we did. I don't</p> <p>23 recall having run the model with different years</p> <p>24 on the back end.</p>	<p style="text-align: right;">Page 527</p> <p>1 nor the top shipments. But I don't recall</p> <p>2 that -- I don't want to say for certain because</p> <p>3 I don't see the specific figure here.</p> <p>4 Q. In applying the national averages to</p> <p>5 data for Cuyahoga and Summit, did you make any</p> <p>6 adjustments for the variation of the figures for</p> <p>7 Cuyahoga and Summit from the national average?</p> <p>8 MR. KO: Object to the form.</p> <p>9 A. Can you rephrase the question?</p> <p>10 BY MR. KNAPP:</p> <p>11 Q. When you applied your percentage of</p> <p>12 harm attributable to shipments to harms in</p> <p>13 Cuyahoga and Summit, did you make any</p> <p>14 adjustments for the differences between the</p> <p>15 national average and Cuyahoga and Summit?</p> <p>16 MR. KO: Same objection.</p> <p>17 A. When we estimated the percentage of</p> <p>18 harms that results from shipments, there was</p> <p>19 no -- we used the predictions from the model, so</p> <p>20 we did not do any ex post adjustments across</p> <p>21 different counties, which one wouldn't want to</p> <p>22 do without a valid theoretical reason for doing</p> <p>23 why.</p> <p>24 They're then, of course, applied to</p>
<p style="text-align: right;">Page 526</p> <p>1 Q. If you look at Paragraph 90, you agree</p> <p>2 that the relationship between opioid shipments</p> <p>3 and mortality may vary across areas, right?</p> <p>4 A. For example, in more or less populated</p> <p>5 areas, that is an example of how it may vary</p> <p>6 across areas, correct.</p> <p>7 Q. And you estimate that the impact --</p> <p>8 well, strike that.</p> <p>9 In running your regression you</p> <p>10 estimate the impact on mortality using the</p> <p>11 national average of 1997 to 2010, average</p> <p>12 shipments across the regression sample, right?</p> <p>13 A. That is correct. It is the average</p> <p>14 shipments from 1997 up through 2010.</p> <p>15 Q. And how different is the national</p> <p>16 average than the figures for Summit and</p> <p>17 Cuyahoga?</p> <p>18 A. My recollection, although it's not in</p> <p>19 the paper so -- excuse me, it's not in the</p> <p>20 report so I don't want to state this with</p> <p>21 100 percent certainty, my recollection is that</p> <p>22 Cuyahoga and Summit are near the average. And I</p> <p>23 think, if I recall correctly, they're within the</p> <p>24 50 percent that's neither the bottom shipments</p>	<p style="text-align: right;">Page 528</p> <p>1 the data on crime, child services, medical</p> <p>2 examiner data, law enforcement data from those</p> <p>3 specific counties. So the estimates that I</p> <p>4 reach at the end are based on data from specific</p> <p>5 counties. They're not based on just the</p> <p>6 national average.</p> <p>7 BY MR. KNAPP:</p> <p>8 Q. The shipment coefficient that you</p> <p>9 apply in calculating the impact on mortality is</p> <p>10 a national statistic, correct?</p> <p>11 A. That is one statistic that applies</p> <p>12 given the variation in the data in all of the</p> <p>13 large counties that are involved in the</p> <p>14 analysis.</p> <p>15 Q. And you didn't make any adjustments to</p> <p>16 that shipment coefficient considering that you</p> <p>17 were going to apply this data just to Summit and</p> <p>18 Cuyahoga?</p> <p>19 A. One has to estimate it across a sample</p> <p>20 of areas. So all of the adjustments associated</p> <p>21 with then applying it to Cuyahoga and Summit</p> <p>22 come in the form of controlling for these other</p> <p>23 factors. These other factors absolutely vary</p> <p>24 across areas, and they clearly -- they explain a</p>

<p style="text-align: right;">Page 529</p> <p>1 large part of the variation in mortality changes 2 across areas. So in that sense we're 3 controlling for differences in Cuyahoga and 4 Summit relative to the rest of the nation. 5 But the specific shipments variable, 6 there's -- we have no way to see whether that 7 number would be different in one or two 8 particular counties relative to the rest of the 9 counties. There's no econometric way one could 10 estimate whether that coefficient is different 11 for just those two counties. You'd need a 12 different type of model entirely in order to 13 estimate a coefficient for a single county. You 14 can't do it with just one observation for a 15 county, or even a group of two counties. You 16 couldn't do it. 17 Q. All right. Let's look at Table 3.10 18 on 64. And I just want to make sure my 19 understanding of these columns is correct, so 20 hopefully these will be relatively simple 21 questions. 22 Column A reports actual mortality for 23 all the counties in your sample, right? 24 A. That is correct, column A is the</p>	<p style="text-align: right;">Page 531</p> <p>1 possible given just one observation per county 2 to have a different -- it's econometrically 3 impossible to have a different coefficient for 4 each county. 5 BY MR. KNAPP: 6 Q. Did you test whether the impacts that 7 you estimated based upon all the counties in 8 your sample lead to unexpected results in any 9 particular county? 10 MR. KO: Object to the form. 11 A. A general thing that one does in 12 looking at regression analysis is often to look 13 at the specific observations and then to see how 14 well the regression fits the observations. 15 To the extent that there are outliers 16 in that, that is, a particular county is way off 17 the regression line, one then often either 18 adjusts the model or sometimes decides to 19 eliminate an observation entirely because it may 20 not be relevant. 21 In this case, as we spoke about 22 earlier, there were four counties that they're 23 not so far off the line but the shipments were 24 so high that it seemed clear that they -- and</p>
<p style="text-align: right;">Page 530</p> <p>1 actual mortality rate. 2 Q. And column B reports the actual 3 shipments for all counties -- excuse me, strike 4 that. 5 Column B reports actual shipments for 6 all counties in your sample, right, the 7 cumulative average? 8 A. That is correct, column B is the 9 cumulative average shipment for the counties in 10 the sample. 11 Q. And then we talked about this, but 12 column D is the shipment coefficient for all of 13 the counties in your sample, right? 14 A. That's correct. That is the -- that's 15 not quite phrased the exact way I would phrase 16 it. That is the shipment coefficient from the 17 regression model that uses cross-county data, so 18 it is the shipment coefficient from the model. 19 Q. But it's not as if there's a different 20 shipment coefficient for different counties 21 included in your sample? 22 A. No. 23 MR. KO: Object to the form. 24 A. No. As I said, it would not be</p>	<p style="text-align: right;">Page 532</p> <p>1 they were from areas where cross-county 2 transshipment was reported by press and others 3 to be big, that they seemed so high that I felt 4 more comfortable using the vast bulk of the 5 other data, the 400 out of 404 other data that 6 did not have any concerns about those issues in 7 those four counties. 8 BY MR. KNAPP: 9 Q. So let me just pick up on something 10 that you said. You said you looked at press 11 articles about high rates of transshipments. 12 What press articles did you look at that 13 referenced high rates of transshipments into or 14 out of Franklin County, Ohio? 15 A. I don't think there were any that 16 specifically mentioned Franklin County, Ohio. 17 There are articles and books that have spoken 18 about transshipments from, for example, Florida, 19 from West Virginia, from Kentucky, from Ohio. 20 And so because the counties with the 21 very high shipments tended to be in states in 22 general where transshipments were reported to be 23 an issue, I thought it -- I thought it more -- a 24 more convincing analysis to eliminate those four</p>

<p style="text-align: right;">Page 533</p> <p>1 observations as being very different on 2 the shipment variable. 3 Q. Did you consider whether it's possible 4 that your regression model would attribute 5 greater than 100 percent impact on mortality 6 when applied to any single county? 7 MR. KO: Object to the form. 8 Which regression model? 9 A. It's -- so, in general, one does look 10 for things like that. But the issue is there 11 are always, of course, points that are off the 12 line, so there are always outlier observations. 13 There may be observations for which 14 there was a particularly high level of shipments 15 relative to population not in those four, or for 16 which other factors imply an increase in 17 mortality where the prediction as a whole could 18 very well lead to an estimate of over 19 100 percent or any other type of issue. 20 That's why as an econometrician you 21 wouldn't use the analysis of this to predict for 22 a single county, but rather one wants to use 23 this to develop an estimate for the set of 24 counties as a whole because that's what this --</p>	<p style="text-align: right;">Page 535</p> <p>1 A. I'm not saying that that's -- I'm not 2 saying that that is the explanation. I'm making 3 two points. The first point is that it is, of 4 course, theoretically possible that a county 5 could be estimated to have more deaths than it 6 actually does because the county does a good job 7 at preventing deaths, so preventing actual 8 deaths relative to -- relative to what would be 9 predicted. So that county is not -- in that 10 eventually, in that hypothetical, that county 11 would have predicted deaths greater than actual 12 deaths, and that would be a perfectly correct 13 statement -- conclusion to draw. 14 And, second, I'm making -- so that's 15 the first point to make. And then the second 16 point to make is that using a regression 17 coefficient to then predict and look at a single 18 county is generally not what an applied 19 economist does, because a single county may have 20 an outlier for a particular reason in a 21 particular year. And the regression says yes, 22 given all the outliers, here is the nature of 23 the data, here is what I -- here's what's true 24 about the data as a whole, but that doesn't --</p>
<p style="text-align: right;">Page 534</p> <p>1 this is what is describing the vast -- the 2 average county in the data set, and that's what 3 that regression coefficient is giving, and, 4 therefore, it's appropriate to evaluate it at 5 the average in the data set. 6 BY MR. KNAPP: 7 Q. You would agree that shipments of 8 prescription opioids can't have more than 9 100 percent impact on mortality, right? 10 A. Of course, the question is 100 percent 11 relative to what? It is possible that there 12 could be fewer deaths than would be predicted by 13 a model. For example, if a county were 14 particularly good at treat -- if a county got to 15 be particularly good at treating people who had 16 opioid overdoses, then the actual mortality rate 17 would be lower than would be predicted on the 18 basis of shipments because the county was 19 successfully able to prevent death that results 20 from opioid use. 21 Q. So it's your testimony that if there's 22 a greater than 100 percent impact on mortality 23 for any given county that that can be explained 24 by shipments into that county?</p>	<p style="text-align: right;">Page 536</p> <p>1 but it doesn't erase what may be an outlier for 2 any number of reasons in a county. 3 And so it's just not -- this is not 4 the methodology you'd use if you wanted to 5 understand that single county. You would sort 6 of almost do an exact time series of that 7 specific county, and you'd use a very different 8 methodology. 9 So just as a -- so the second point is 10 as a general matter, I wouldn't apply this to a 11 single county and say, oh, okay, that's the 12 obvious way to do it. Instead I would do what 13 we did here and what most econometricians would 14 do, which is to apply it to the sample as a 15 whole. 16 Q. Okay. Let's look at Paragraph 109. 17 So now Paragraph 109, we're looking at your 18 application of the direct model to the period -- 19 to elicit mortality in the period 2011 to 2016, 20 right? 21 A. Yes, that is correct. 22 Q. Why did you conclude that it was 23 reasonable to assume that the relationship 24 between opioid shipments and deaths prior to</p>

<p style="text-align: right;">Page 557</p> <p>1 regression -- not modelled in the baseline 2 regression contributed to increases in opioid 3 mortality, what factors did you have in mind 4 there? 5 A. I was referring back specifically to 6 the discussion that we had earlier of the 7 analysis like that of Professor Ruhm and 8 Professors Case and Deaton. 9 So in that case there was a discussion 10 about were all of the issues associated with 11 despair in different areas included in the 12 models that Professors Case and Deaton and 13 Professor Ruhm estimated, and as you noted 14 correctly that not everything that one would 15 like to have data on to measure despair we 16 actually do have data on. And so, therefore, 17 there are variables that are omitted from the 18 model that if the data existed we would like to 19 have included in the model. 20 Q. To the extent that any of those 21 variables associated with despair for which you 22 don't have data contributed to mortality, your 23 indirect regression attributes those harms to 24 the shipments of prescription opioids?</p>	<p style="text-align: right;">Page 559</p> <p>1 able to get data for have a positive or negative 2 impact on mortality? 3 MR. KO: Objection to the form. 4 Objection, asked and answered. 5 A. That's correct. Just to restate, I do 6 not know for the data that I don't have whether 7 the components of those variables that are not 8 correlated with the independent variables would 9 have a positive relationship with opioid 10 mortality or a negative relationship with opioid 11 mortality or no relationship with opioid 12 mortality. So I cannot give an econometric 13 answer to the question of what impact including 14 such variables would have. 15 BY MR. KNAPP: 16 Q. In preparing your indirect model, you 17 didn't consider the change in the number of pain 18 diagnoses in your -- as a variable in your 19 indirect regression? 20 A. Let me give two answers to that. 21 First, in the indirect model, we're 22 not using change variables, we're using levels, 23 because we're estimating the mortality rate at a 24 point in time.</p>
<p style="text-align: right;">Page 558</p> <p>1 A. That's not correct. To the extent 2 that they contribute to mortality -- so two 3 things. One is to the extent they're correlated 4 with the variables that are included, they will 5 be picked up by the variables that are included, 6 so it's only to the extent that they're not 7 correlated with the variables that are included, 8 so that's the first issue. 9 And then the second issue is that 10 nothing says that those variables have to 11 positively affect the mortality rate. Some of 12 them could negatively affect the mortality rate, 13 again, particularly if you're looking at the 14 part that is independent of the variables that 15 are included. 16 So it does not have to be the case 17 that any variable that -- it does not have to be 18 the case that any variable that is omitted, by 19 including it one would automatically assign 20 less -- a smaller share of opioid-related deaths 21 to opioid shipments. 22 Q. And just to be clear, you haven't been 23 able to quantify whether any of these factors 24 associated with despair that you haven't been</p>	<p style="text-align: right;">Page 560</p> <p>1 In the case of approach 1, we're 2 estimating it at '93 to '95. In the case of 3 approach 2, we're estimating it -- I'm sorry. 4 In the case of approach 2, we're estimating at 5 '93 to '95. In the case of approach 1, we're 6 estimating from 2008 to '10. So the change 7 would not -- doesn't enter into those 8 variables -- excuse me, into those regressions. 9 But in addition, there's an issue 10 about including the name of pain diagnoses, 11 which is that physicians need -- for many -- in 12 many occasions physicians need a diagnosis 13 before writing a prescription. So individuals 14 who get a prescription for opioids will be 15 diagnosed generally with pain or -- and 16 oftentimes with pain. 17 Just knowing what share of 18 individuals' diagnosis of pain is conflating the 19 fact that the variation in the shipments of 20 opioids driven by the defendants' misconduct may 21 be also influencing doctors writing down of pain 22 as a diagnosis for the patient, some form of 23 pain as a diagnosis for the patient, and, 24 therefore, the pain reports.</p>

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1 not can we explain more of differences in crime.
 2 So the issue here is not whether the R-squared
 3 increases from 79 percent and 78 percent, both
 4 of which are obviously very high numbers; the
 5 issue is whether they would affect the
 6 coefficients on the shipment variables. And
 7 that is not just a statement that says -- you
 8 can't tell the impact on the shipment variable
 9 just by saying if I included that variable,
 10 would it help to explain changes in crime. That
 11 by itself does not tell you anything about
 12 whether the coefficient on the shipment variable
 13 would change.

14 BY MR. KNAPP:

15 Q. Sitting here right now, you don't know
 16 how any of these factors would impact the
 17 coefficient on shipments, correct?

18 A. As --

19 MR. KO: Object to form.

20 A. As a theoretical matter, you cannot
 21 say how these variables would affect the
 22 shipment coefficient. And because the data, to
 23 the best of my knowledge of them, do not exist
 24 to measure them, I cannot do an estimate to say

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1 how including these would affect the coefficient
 2 estimate.

3 So that is, like everything, an issue
 4 associated with a regression, which is that it
 5 has -- it can only tell about the things it has.

6 But I again want to emphasize, just
 7 saying that these variables matter is not --
 8 would matter is not the issue here. It's more
 9 involved than that.

10 BY MR. KNAPP:

11 Q. Let's look at Appendix 3.J in your
 12 report. I want to start with Table J.1. And we
 13 talked a bit about this yesterday. What is your
 14 understanding of where these percentages come
 15 from in Table J.1?

16 A. These percentages were given to me by
 17 counsel who said that they were the output of
 18 Mr. McCann's analysis.

19 Q. Have you looked at Mr. McCann's
 20 report?

21 A. I have not looked at Mr. McCann's
 22 report.

23 Q. Do you know if any of these
 24 percentages are actually in Professor McCann's

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1 report?

2 A. I have not looked at Mr. McCann's
 3 report, so I can't answer that question.

4 MR. KO: I don't know for sure, Tim,
 5 but I think he's not a professor.

6 MR. KNAPP: I'm elevating him.

7 A. After this, Mr. Knapp, we may choose
 8 to make you a professor.

9 BY MR. KNAPP:

10 Q. Depends upon the subject, I don't
 11 know. We'll have to see.

12 A. I don't know, you seem to have a
 13 knowledge of econometrics that is quite
 14 impressive.

15 Q. Oh, well, I appreciate that. Thank
 16 you very much.

17 MR. KO: So complimentary.

18 BY MR. KNAPP:

19 Q. I would say the same about you,
 20 Professor Cutler.

21 A. But not about my knowledge of law,
 22 that I assure you.

23 BY MR. KNAPP:

24 Q. Okay. Well, let me just start with

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1 this.

2 We received an e-mail from your
 3 counsel identifying the supplemental report of
 4 Dr. McCann as the source of the figures in Table
 5 J.1, okay?

6 I'm going to hand you that
 7 supplemental report as Cutler Exhibit 15, and
 8 I'd ask you to identify for me where these
 9 percentages come from.

10 (Whereupon, Cutler Exhibit Number 15
 11 was marked for identification.)

12 A. Do you want me to look through the
 13 whole report to find these?

14 BY MR. KNAPP:

15 Q. I'm just asking you if you can
 16 identify them anywhere in the report.

17 A. So as I just said, I have not seen the
 18 deposition -- excuse me, the expert report of
 19 Dr. McCann before this. So I would be happy to
 20 look through the report to do that, and I would
 21 be more than willing to do that, but I don't
 22 know offhand where in the report these numbers
 23 would have come have.

24 Q. You know what, it's a short report,